NRC·CNRC
Institute for Research in Construction

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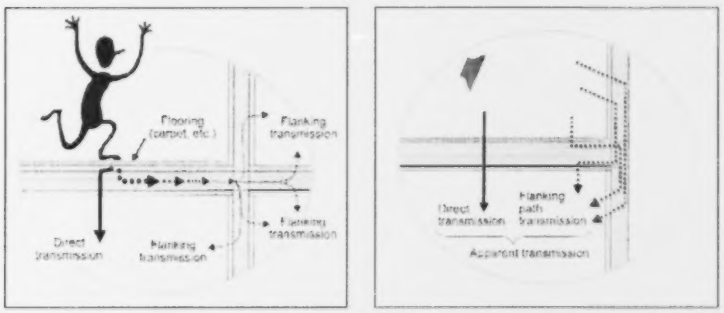
construction innovation

New guide for achieving acceptable sound isolation in wood-frame construction available online

Occupant satisfaction with the sound isolation between their own unit and other adjacent units is determined by the complex interaction of the separating wall or floor and all the elements coupled to that assembly. To help practitioners create wood-frame buildings to meet their design objectives, NRC-IRC has developed a guide that can be used as a framework for design.

The Guide will help designers choose the structural elements, the fire blocks and the connections at the junctions of partition walls and floors. Careful selection of these components is necessary in order to avoid the introduction of paths that allow significant structure-borne sound transmission to by-pass the separating partition. This type of sound transmission, also known as flanking transmission, reduces the *apparent sound isolation* (see sidebar).



Flanking transmission occurs in all buildings between horizontally, vertically, and diagonally separated rooms, as shown in the figure to the left. However, flanking can be controlled by proper design.

Occupant satisfaction is determined by the sum of all transmission paths—i.e., the apparent transmission (as shown in the figure to the right). *Apparent sound isolation* is a measure of the building's ability to block both direct transmission and flanking transmission.

Highlights

Code development system 2
Fire engineering guidelines 6
High-performance stucco 7
Electrical load reduction 8
Drinking water infrastructure 10

Good news for builders

The NRC-IRC studies showed that this flanking transmission can be controlled, and sound isolation (both airborne and impact) maintained, through the proper design of details. Practitioners can use the Guide to design separating walls or floors to prevent flanking without having to resort to over-design, or redundancy, which is a waste of both money and materials. Now it is possible to establish an effective design framework using a series of engineered assemblies to provide effective system performance.

The Guide demonstrates that the higher the level of sound isolation required, the more important flanking, and its prevention, becomes. For a building to achieve an apparent STC (ASTC) of 50, or more, flanking must be considered at the design stage and details chosen that are consistent with this desired level of sound isolation. Fortunately, the Guide provides practical solutions and examples of assemblies that can achieve high levels of sound isola-

Continued on page 9

Read *Construction Innovation* on the Web at **http://irc.nrc-cnrc.gc.ca/ci**

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2007-03624/

Provinces and territories to be consulted on proposed changes to code development system

The joint task group of the Canadian Commission on Building and Fire Codes (CCBFC) and the Provincial/Territorial Policy Advisory Committee on Codes (PTPACC), responsible for evaluating the national code development system, has been mandated to consult with the provinces and territories on proposed changes to the current code development system. The proposed changes are designed to make the system more transparent and responsive.

Changes to the national code development system are only made by the CCBFC once the advice of the provinces and territories (through the PTPACC) has been received and considered.

The CCBFC reviewed the task group's recommendations and then assigned it the job of seeking agreement from the provinces and territories on the proposed changes before giving them further consideration. Changes to the national code development system are only made by the CCBFC once the advice of the provinces and territories (through the PTPACC) has been received and considered.

Consultation with the provinces and territories, and stakeholders on the proposed changes to the code development system could begin as early as this fall.

One of the more significant changes proposed by the joint task group is that the process for approving technical changes to the national code documents be an annual one, with regular milestones and activities. Another of its proposals is that, starting in 2010, the national construction codes be published every three years.

The joint task group has recently published its progress report, which includes the draft recommendations as presented to the CCBFC, as well as background information and key features of the proposed changes. It is now available at www.nationalcodes.ca/ccbfc/twojointtg_e.shtml#priorities.

Consultation with the provinces and territories, and stakeholders on the proposed changes to the code development system could begin as early as this fall. Details will be posted on the national codes Web site in the coming months, at which point the joint task group will seek comments from the public.

If you have any questions on the proposed changes to the code development system, please contact John Archer, Secretary, Canadian Commission on Building and Fire Codes, at (613) 993-5569, fax (613) 952-4040, or e-mail john.archer@nrc-cnrc.gc.ca.

CCBFC standing committees start work on next edition of the national model codes

Now that the 2005 national model code documents have been released, the Canadian Commission on Building and Fire Codes (CCBFC) and its standing committees are beginning a new cycle of code development.

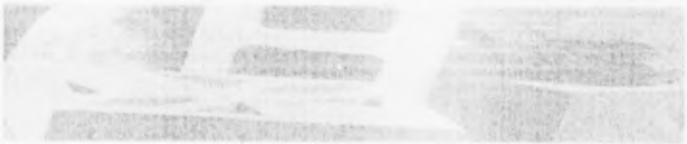
The standing committees will focus on the initial code development priorities approved by the Commission. The major tasks, which are specified in the work plans of the various standing committees, will for the most part be carried out by task groups.

If you would like to learn more about the upcoming tasks and priorities for the next code cycle, go to www.nationalcodes.ca/ccbfc/committee_e.shtml, click on one of the seven standing committees, then click on "Projects."

Requests for changes

The standing committees are also considering new requests for changes to the codes for the next edition of the national model codes, to be published in 2010. Stakeholders and the public at large, who would like to request a change to one of the national model codes, can now submit their requests.

For information on how to request a change, please go to www.nationalcodes.ca/request_contact_e.shtml.



CCMC

New CCMC Evaluation Reports

Company	Product Name	CCMC #	Description
Thomas & Betts Manufacturing Inc./ Thomas & Betts Fabrication Inc.	Lumacell Series RSNVII, RSNVIII	13233-R	"Lumacell Series Products" are battery-powered, uninterruptible power systems that provide emergency AC power for lighting circuits in the event of a primary power source failure.
Hubbell Canada Inc.	Dual-Lite/Prescolite Series Product	13234-R	"Dual-Lite/Prescolite Series Product" is a battery-powered, uninterruptible power system that provides emergency AC power for lighting circuits in the event of a primary power source failure.
Calvert Company, Inc.	GL 3000 Glulam	13235-R	"GL 3000 Glulam" is a glue-laminated timber construction made of 2.4E laminated lumber intended for structural use where permitted by the NBC 2005.
Jager Building Systems, Inc.	JSI 2000, 3000, 4000 and 4400 Series I-joist	13236-R	JSI 2000, 3000, 4000 and 4400 I-joists are prefabricated wood I-joists consisting of two continuous flanges and an oriented strandboard web and are intended for structural applications such as floor joists, roof joists, blocking panels and rim boards.
Owens Corning Canada Inc.	Owens Corning PROPINK Wall Insulation System	13240-R	The PROPINK system is an insulation system for wood-frame walls comprising blown-in mineral insulation that is injected through mesh stapled to the framing members.
Thomas & Betts Manufacturing Inc./ Thomas & Betts Fabrication Inc.	Ready-Lite Series RLII, RLIII	13241-R	Ready-Lite RLII single-phase and Ready-Lite RLIII 3-phase Central AC System for Emergency Lighting are battery-powered, uninterruptable power systems that provide emergency AC power for lighting circuits in the event of a primary power source failure.

For further information on the performance, usage and limitations of these products, as well as other reports and listings by CCMC, see the Web Registry of Product Evaluations located at **http://irc.nrc-cnrc.gc.ca/ccmc/regprodeval_e.html.**

What's new on the NRC-IRC Web site

http://irc.nrc-cnrc.gc.ca/index_e.html

Have you visited the NRC-IRC Web site lately?

Stop by and check out the most recent additions:

- **Sustainable Built Environment (SBE) initiative**: NRC-IRC's strategic plan for 2004–2009 (http://irc.nrc-cnrc.gc.ca/fulltext/nrcc46892/) introduced new initiatives that involve reorganizing and expanding activities to address sustainability and climate change, and to align more clearly with current industry and government priorities. SBE research and technology transfer activities are focused on three overlapping themes:
  - Climate change
  - "Green" buildings
  - Life-cycle performance

  For more information on the Sustainable Built Environment initiative please visit http://irc.nrc-cnrc.gc.ca/sbe/index_e.html.
- **Project Factsheets**: print-friendly, one-page summaries of all our collaborative research projects. http://irc.nrc-cnrc.gc.ca/projects_e.html.
- **Business Opportunities**: provides links to the various business services that NRC-IRC offers, such as intellectual property available for licensing, unique facilities and expertise, success stories, research services, and product evaluation services. http://irc.nrc-cnrc.gc.ca/business/index_e.html.

And just a reminder:

Our Construction Technology Updates are free on the Web in both html and pdf at http://irc.nrc-cnrc.gc.ca/ctus.

You can search all NRC-IRC publications since our founding in 1947 at http://irc.nrc-cnrc.gc.ca/pubs/index_e.html where you will find over 12,000 references, more than 3,700 of which are available in full text, free of charge.

The site, which has 200,000 visitors each month, is updated constantly, so be sure to visit often.

Do you have a comment or question about our site? We'd love to hear from you. Just send an e-mail to Webadmin.IRC @nrc-cnrc.gc.ca.

All feedback welcome!

Don't forget that you can receive *Construction Innovation* electronically and remove yourself from the mailing list for the print version. Please go to http://irc.nrc-cnrc.gc.ca/pubs/alert_e.html.

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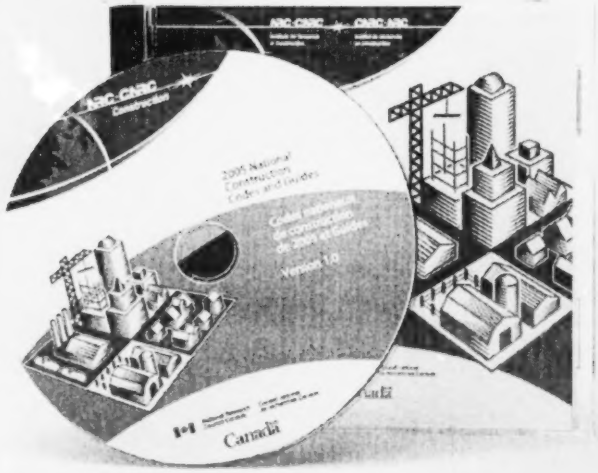
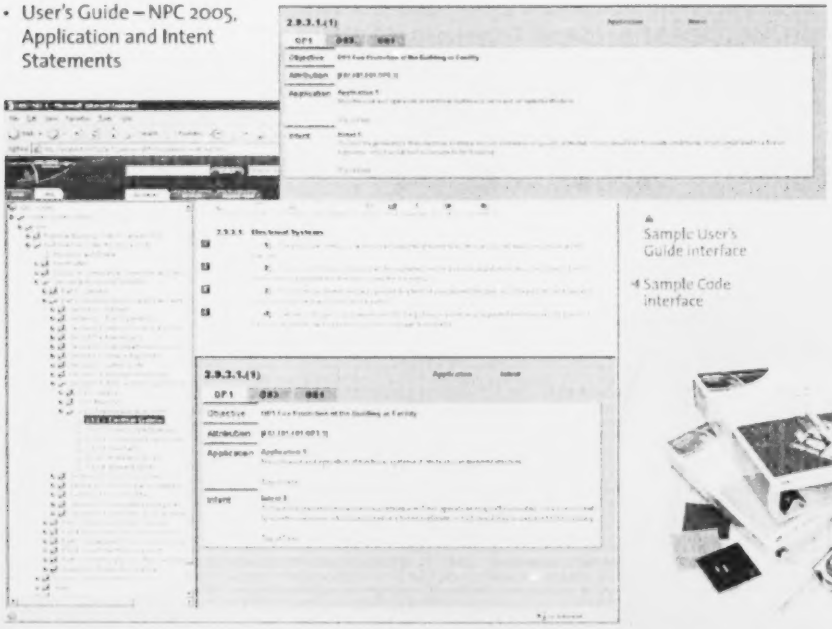


Now Available on CD-ROM!

The 2005 National Construction Codes and Guides CD-ROM contains the following publications, each of which is controlled by a convenient unlocking mechanism:

- National Building Code of Canada 2005
- National Fire Code of Canada 2005
- National Plumbing Code of Canada 2005
- User's Guide – NBC 2005, Application and Intent Statements
- User's Guide – NFC 2005, Application and Intent Statements
- User's Guide – NPC 2005, Application and Intent Statements

The **CD-ROM version of the 2005 National Building, Fire and Plumbing Codes** includes the Code provisions, which are linked to **application statements** (detailed statements on what the provisions apply to) and **intent statements** (detailed statements on the specific intent of the provisions). The Code provisions are also linked to **objectives** (statements that describe the overall goals that the Code provisions are intended to achieve) and to **functional statements** (statements that describe conditions that help satisfy the objectives).



Sample User's Guide interface

Sample Code interface

Main Features – Codes

- Links allowing easy navigation between various Parts of the Codes
- Instant links to cross-references, defined terms, Appendix Notes, etc.
- Powerful, easy-to-use search engine
- Changes to the 1995 editions of the Codes displayed on colored background
- Automatic updating with revisions to the 2005 Codes

The User's Guides to the 2005 National Building, Fire and Plumbing Codes contain the **application and intent statements** applicable to the Code provisions. **They do not include the Code provisions: the User's Guides are published as a complement to the printed versions of the Codes.**

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- Powerful, easy-to-use search engine

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- NIC or modem for receiving updates
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new User's Guide – NBC 2005, Application and Intent Statements	n/a		n/a		$150		$600		$900	
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* 1995 editions also available
** Includes application and intent statements
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C/ REVISED SEPTEMBER 2006

Fire Research program collaborates on international fire engineering guidelines

Since the 1990s, there has been a move toward performance-based rather than prescriptive building codes in many countries around the world. This shift has given greater flexibility to building designers and engineers, facilitating performance-based design and the introduction of innovative products and systems. At the same time, it has made the task of assessing the resulting design solutions more challenging.

To help both fire engineers and regulators with the new approach, NRC-IRC's Fire Research program, in consultation with the Canadian Codes Centre, has partnered with organizations in the United States, Australia and New Zealand to develop international fire engineering guidelines. The team came together through the Interjurisdictional Regulatory Collaboration Committee, an international group of building code developers, to produce a document that outlines the process and procedures necessary to develop and assess a building design using fire engineering methods.

This document, based on a set of Australian fire-safety engineering guidelines, was enhanced to reference both nationally and internationally available standards, guides and associated documents, and uses both imperial and SI units. It builds on a number of earlier advances in documenting the process of fire engineering for building design.

The document has four specific parts that provide a systematic, logical approach to fire engineering. The introduction, Part 0, describes fire engineering—both the general topic and the profession—and the link between the profession and the regulatory system in each jurisdiction. Part 1 describes the typical process of fire engineering, including the type of information needed on the scope of the project, the characteristics of the building and its occupants, and the objectives of the design. Part 2 outlines several methodologies that may be used in the fire engineering process, and provides information on the spread and control of smoke and fire, occupant evacuation and fire services intervention. Part 3 provides a selection of data for use in applying the methodologies presented in Part 2 or other chosen methodologies.

The International Fire Engineering Guidelines, 2005 Edition is available at http://www.iccsafe.org (then click on "ICC Store" and enter the title in "Search Products").

Specific questions on the guidelines can be addressed to Dr. Noureddine Bénichou at (613) 993-7229, fax (613) 954-0483, or e-mail noureddine.benichou @nrc-cnrc.gc.ca.

Newsbrief

Jean-Luc Dion, new chair of the NRC Institute for Research in Construction Advisory Board

Jean-Luc Dion, President of Les Entreprises de Gestion Option+ Inc., has been named as chair of the NRC Institute for Research in Construction Advisory Board. For the past three years, Mr. Dion has brought his considerable experience in the construction management and development sectors to the board. He succeeds Mr. Michael P. Baetz, former president and CEO of Ainsworth Inc., Toronto, who served as chair from 2000 until June of this year.

The advisory board, which is composed of representatives from industry, academia and the public sector, offers NRC-IRC a perspective on construction industry issues and trends in Canada and from around the world, provides strategic direction to its programs, and monitors the alignment of the institute with NRC's corporate vision, plans and objectives.

In addition to Mr. Dion, the current members of the Advisory Board are:

- Mr. Reg Andres, Vice-President, R.V. Anderson Associates Limited, Toronto
- Mr. Paul Giannelia, President, SC Infrastructure Corp., Calgary
- Dr. James Hill, Director, National Institute of Standards and Technology, Building and Fire Research Laboratory, Gaithersburg, MD
- Mr. Richard Miller, President, Clayton Developments Limited, Halifax
- Dr. Aftab Mufti, President, ISIS Canada Research Group, Winnipeg
- Mr. Philip Pratt, Principal, PHB Group Inc., St. John's
- Mr. Jeff Vasey, Director, Building Policy Branch Ministry of Community, Aboriginal and Women's Services, Victoria

To communicate with the NRC-IRC Advisory Board or to express an interest in becoming a member, please contact John Berndt at (613) 993-5353, fax (613) 941-0822, or e-mail john.berndt@nrc-cnrc.gc.ca.

NRC-IRC completes pilot project aimed at developing high-performance stucco

It's impossible to drive through a new suburb without noticing the rise in popularity of stucco, or portland cement plaster, as an exterior finish. Relatively inexpensive, durable, attractive—it makes a fine finishing for a home. Unfortunately, on some occasions, wood-frame exterior walls with a stucco cladding have failed to perform up to design expectations in locations with heavy or sustained rainfall.

Thanks to researchers in NRC-IRC's Building Envelope and Structure program, however, a solution may not be far away. Working in cooperation with the Canada Mortgage and Housing Corporation (CMHC), they have completed a pilot project looking into the feasibility of developing a portland cement stucco material that will limit liquid water entry on its surface, while also allowing water vapour to dry out of it (see sidebar). Preliminary tests comparing the specifically engineered stucco materials against stucco materials commonly used in Canada suggest the project has promise.

To conduct these preliminary tests, the researchers divided the study into two parts. The first part focused on testing conventional stucco materials (those commonly used in Canada) to establish their performance in limiting liquid water entry and allowing water vapour drying to occur. The researchers looked at four stucco mixes, including one that satisfied the minimum requirement as stipulated in Canada's National Building Code (NBC).

The second part of the project focused on developing a new high-performance stucco material. The researchers put together four different stucco mixes designed to absorb less liquid water and allow more water vapour to dry out than conventional stucco materials. Previous NRC-IRC research had shown that stucco is one of the most influential materials on moisture management among the major components of a building envelope, which include stucco, a sheathing membrane, sheathing board and a vapour barrier. In addition, it has shown that a stucco material's ability to resist liquid water absorption and encourage water vapour drying positively influences overall moisture management in exterior wood-frame stucco wall assemblies.

The results from the preliminary testing suggest that two of the high-performance stucco materials investigated show promise for limiting liquid water entry while also allowing water vapour to dry out. Because these are trial mixes, however, further research and refinement of the mixes is necessary. In future investigations, the researchers will carry out further numerical modelling to optimize the hygrothermal properties of the high-performance stucco materials, develop the most suitable mix design, and evaluate the long-term performance of the materials in a field study.

If you have specific questions on this project, or if you are interested in participating as an industry partner, please contact Dr. Phalguni Mukhopadhyaya at (613) 993-9600, fax (613) 998-6802, or e-mail phalguni.mukhopadhyaya@nrc-cnrc.gc.ca.

An interesting MEWS off-shoot

This pilot project and others like it are part of a larger project resulting from NRC-IRC's Consortium for Moisture Management for Exterior Wall Systems (MEWS). (Go to http://irc.nrc-cnrc.gc.ca/bes/hmpe/mews/index_e.html for more information about MEWS.) In it, NRC-IRC researchers are using the information gained from MEWS on the ability of certain wall systems to manage moisture sources and modifying construction materials to meet identified needs. This new project is part of a larger effort at NRC-IRC to develop advanced, high-performance materials to deliver moisture management strategies for wall systems. These materials are intended to meet long-term performance and durability requirements for the wide range of climate zones across North America.

NIST report on Hurricanes Katrina and Rita

An article in the March 2006 issue of *Construction Innovation*, "NRC-IRC researcher joins NIST team to survey Hurricane Katrina damage" referred to the full report to be issued by NIST.

The NIST report, *Performance of Physical Structures in Hurricane Katrina and Hurricane Rita: A Reconnaissance Report* (NIST Technical Note 1476), is now available online at http://www.bfrl.nist.gov. The Web site also contains links to a press release, FAQs, an executive summary of the report, and a comprehensive set of briefing slides.

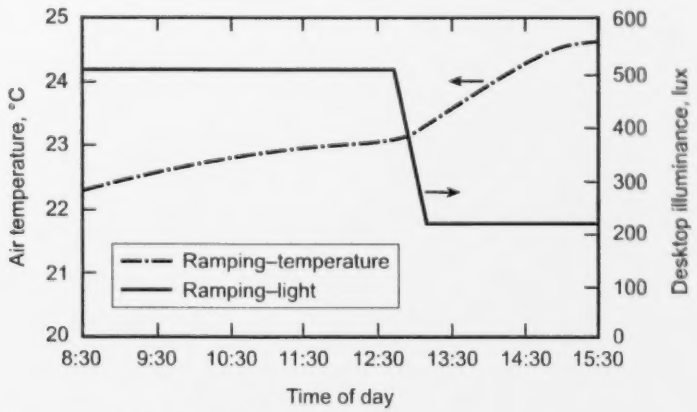
Study looks at maintaining an acceptable indoor environment during electrical load reduction

When total customer demand for electricity exceeds available supply, brownouts or blackouts may occur, with substantial social and economic consequences. In most parts of North America the greatest risk is on hot summer afternoons, when the demand for cooling is at its highest in both homes and commercial buildings, and when the demand for electricity for lighting and appliances in commercial buildings has yet to subside.

Utilities typically have good models that can forecast the risk of problems several hours in advance, and they can then take steps to deliver additional power from standby generators, to purchase power from other utilities, often at a high cost premium, or to reduce demand.

One way to reduce demand is through load shedding, which refers to a situation where a major user of electricity cuts down its usage during periods of short supply. There is growing interest in getting commercial buildings involved in load shedding when prompted to do so by their electrical utility. For example, lighting can be dimmed and, in the cooling season, the thermostat temperature can be increased to reduce the amount of air-conditioning required. However, this will degrade the indoor environment relative to prevailing operational guidelines.

NRC-IRC researchers have reviewed the literature on the effects of steady changes (ramps) in temperature and illuminance from electric lighting on occupants. The research results culled from this review suggest that temperature changes typically associated with load shedding (approximately 1.5°C over 2–3 hours) are unlikely to be detected by occupants, and if they are, would likely be considered acceptable under the circumstances. Studies of rapid changes in illuminance (in the order of 10–100 lx/s) imply that the light level can decline by approximately 20% without being detected. With slower rates of change (1 lx/s or less), greater reductions in illuminance may remain undetected, and acceptable.



Typical temperature and lighting profiles on ramping days

However, previous studies have focused on whether ramps are detectable and acceptable, and little is known about their effects on occupant mood, satisfaction and task performance. Furthermore, previous studies examined ramps in temperature and lighting independently, rather than in combination.

Analysis showed that people did not generally detect the changes in the indoor environment induced by load shedding, and that there were both positive and negative effects on their satisfaction and performance.

To address these shortcomings, NRC-IRC researchers conducted a controlled laboratory study in which 62 participants spent a day in a full-scale office laboratory, completing

This research was conducted in collaboration with

- Public Works and Government Services Canada (PWGSC) and Natural Resources Canada (NRCan) as part of a Program on Energy Research and Development (PERD) project, and with a
- new advisory board on PERD's building controls research projects, with participation from: Energy Ottawa, Canadian Electricity Association, BC Hydro, Hydro-Québec, Société immobilière du Québec, Canlyte, Encelium, International Facility Management Association, Siemens, Honeywell, Institut de reherche Robert-Sauvé en santé et en sécurité du travail, NRCan, PWGSC, Building Owners and Managers Association, and Bosch.

questionnaires and standard office tasks. One group of participants was exposed to ramping typical of a load shed in the afternoon: workstation illuminance was reduced by 0.15 lx/s, and the temperature increased by ~1.5°C over a 2.5-hour period; another group experienced no ramping.

Analysis showed that people did not generally detect the changes in the indoor environment induced by load shedding, and that there were both positive and negative effects on their satisfaction and performance. On balance, our findings indicate that load shedding typical of current suggested practice is a reasonable response to peak power emergencies. While indoor environment conditions may drift from recommended practice, this is unlikely to create substantial hardship for occupants.

Nevertheless, previous NRC-IRC laboratory research on lighting has shown that people who experience luminous conditions closer to their own preferred levels experience a bonus in terms of mood, satisfaction, comfort and motivation. Therefore, plans to use load shedding to save energy dollars when there is not a threat of blackout should be carefully considered until more is known about the effects on occupants in real workplaces.

For more information about this research, contact Dr. Guy Newsham at (613) 993-9607, fax (613) 954-3733, or e-mail guy.newsham@nrc-cnrc.gc.ca. You can also visit the project Web site at http://irc.nrc-cnrc.gc.ca/ie/lighting/office/demand_e.html.

Load-shedding strategies in houses

Twin houses at the Canadian Centre for Housing Technology (CCHT)

Similar load-shedding strategies can be contemplated for residential buildings. In recent studies performed at the Canadian Centre for Housing Technology (CCHT), researchers found that various thermostat set-forward strategies can be used to delay the operation of the central air conditioner until after the utility's peak load has occurred. For example, increasing the temperature of the thermostat by 3°C was shown to effectively delay the use of the air conditioner for up to seven hours, while the temperature of the house gradually floated upwards.

Using this strategy during the electric utility's peak load periods could shed about 2 kW from the peak demand of each centrally air-conditioned house on a hot summer afternoon, when summer utility peaks typically occur.

For more information about thermostat set-forwards and set-backs, go to http://www.ccht-cctr.gc.ca/setback_e.html.

New guide for achieving acceptable sound isolation in wood-frame construction available online

Continued from cover

tion. Because the Guide uses a framework based on a systems approach, the added cost of controlling flanking, and achieving a higher degree of sound isolation, should be minimal.

To download the Guide, go to the NRC-IRC Web site at http://irc.nrc-cnrc.gc.ca/fulltext/rr/rr219/. A steering committee comprised of technical representatives from each of the supporting partners (see sidebar) reviewed the details and approaches to ensure their practicality. Complete architectural drawings in AutoCad are provided for convenience. Technical information, and the basis for the Guide, is also available at http://irc.nrc-cnrc.gc.ca/fulltext/rr/rr218/.

For more information, please contact Dr. Trevor Nightingale at (613) 993-0102, fax (613) 954-1495, or e-mail trevor.nightingale@nrc-cnrc.gc.ca.

The Guide is the outcome of four research projects conducted over eight years. The industry partners were Canada Mortgage and Housing Corporation, Forintek Canada Corporation, Marriott International, National Research Council Canada, Owens Corning, Trus Joist, and USG.

New research project identifies key areas of research needed for drinking water infrastructure

Common sense dictates that no one should drink water from a dirty cup. However, few people realize that high-quality drinking water has to travel from the water treatment plant through a network of pipes that are often deteriorated before it reaches the tap. It may come as a surprise to some to learn that the water itself may be contributing to the deterioration of the pipe material. Different water sources, treatment processes and treatment chemicals can have a variety of effects on the chemical composition of drinking water. These changes in composition can lead to deterioration of both pipes and water quality if the chemistry between the pipe material and the water is not compatible.

Many water utilities are introducing new treatment processes to comply with stricter water quality requirements; for example, a requirement to reduce the level of disinfection by-products, which are a consequence of the source water chemistry and disinfection chemicals used. Utilities are also making a serious effort to rejuvenate those distribution pipes that are nearing the end of their service life. Realistically, rehabilitation or replacement of pipes can only take place over long periods of time, resulting in a distribution network that varies widely in terms of age and condition. Meanwhile, the effects of changes in treatment processes are relatively fast. These scenarios raise questions about how changes in water treatment processes affect the integrity and long-term performance of the distribution network.

To identify key research that needs to be done in order to better understand the impact of water quality on the integrity of the distribution network, the Buried Utilities group at NRC-IRC and the American Water Works Association Research Foundation (AwwaRF) recently completed a joint project. As part of this project, a one-day workshop was held at NRC's Ottawa campus in March 2006, involving a panel of experts from Canada and the U.S.

Drinking water may contribute to the deterioration of pipe materials.

Different water sources, treatment processes and treatment chemicals can have a variety of effects on the chemical composition of drinking water.

The workshop helped AwwaRF identify significant research areas for future investigation, including:

- The evaluation of how changes in water sources can affect different components of the distribution network: for instance, surface water can corrode unlined iron pipes faster than groundwater.
- The reconciliation of conflicting impacts of water composition (chemistry) on different pipe materials; for instance, water composition compatible with iron pipes may be incompatible with copper pipes. Therefore, a change in water composition, by the addition of chemicals to protect iron pipes, may cause failure of copper pipes.
- The evaluation of unintended effects of change to water treatment processes; for instance, increasing the amount of chlorine to kill pathogenic microorganisms can cause deterioration in some pipe materials.
- The evaluation of the effect of changes in water composition on the host pipes in terms of both the duration and frequency of these changes. For instance, the effect on distribution pipes when the utility regularly switches between surface water and groundwater sources to meet seasonal demand.
- The development of a decision-support system to help utilities evaluate the effect of changing water-treatment practices on the deterioration of different pipe materials.

NRC-IRC's Centre for Sustainable Infrastructure Research (CSIR) in Regina has initiated a number of strategic research projects related to water quality in distribution infrastructure and would like to hear from potential research and industry collaborators. If you are interested in learning more about this project, please contact Dr. Syed Imran at (306) 780-8660, fax (306) 780-3421, or e-mail syed.imran@nrc-cnrc.gc.ca. You can also visit the Web site at http://irc.nrc-cnrc.gc.ca/ui/bu/integrity_e.html.

Sustainable Infrastructure:
Techniques, Tools & Guidelines
www.bsi.gc.ca

NRC · CNRC

Building Science Insight 2006

Each year, NRC-IRC presents a national seminar to provide construction professionals with practical information. Each seminar focuses on a single topic and reports the results of NRC-IRC research, as well as information from other organizations in North America and abroad.

The state of Canada's civil infrastructure systems presents one of the major challenges we face at the beginning of the 21st Century. These systems consist of assets ranging from bridges to buildings, from buried to overhead utilities, and they are often in a state of flux as priorities shift, assets deteriorate and technologies evolve. Ensuring their sustainability is critical to the well being of all Canadians.

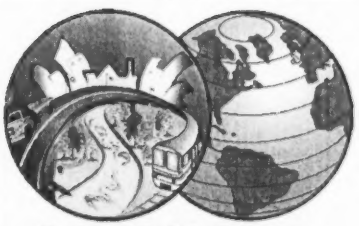
Sufficient funds are almost never available to maintain or renew all deficient assets in any one jurisdiction, making it essential to prioritize and select interventions that come closest to meeting an organization's prime objectives. Lack of data and limited understanding of deterioration processes result in the less than optimal selection of projects for intervention. In practice, decisions are often made subjectively and without regard to available scientifically based techniques, tools and guidelines.

To assist communities in maintaining sustainable infrastructure, *Building Science Insight 2006* will address some of the challenges and opportunities related to achieving the necessary quality, efficiency and durability of these systems. The seminar will focus on the engineering techniques, tools and guidelines required to maintain and renew an aging and diverse infrastructure portfolio. More specifically, it will examine what is required to sustain infrastructure assets for future generations.

The National Research Council's Institute for Research in Construction has amassed considerable expertise in this arena over the past 50 years. More recently, NRC has participated in numerous research projects related to the management of sustainable infrastructure in collaboration with municipalities, departments of transportation, private companies, and federal departments across North America and overseas. *BSI 2006* will highlight the outcomes of these research activities and address other issues related to the management of sustainable infrastructure.

Technical Program:

- *A Generalized Framework for Municipal Infrastructure Management.* Dr. Dana Vanier, NRC-IRC Research Officer.
- *A Holistic Modelling Approach to Predict the Effects of Aging Pipes on Water Quality in Distribution Systems.* Dr. Rehan Sadiq, NRC-IRC Research Officer.
- *Managing Failure Risk in Large Water Transmission Mains.* Drs. Yehuda Kleiner and Balvant Rajani, NRC-IRC Research Officers.
- *Decision-Support Tools for Life-Cycle Management of Concrete Bridges.* Dr. Zoubir Lounis, NRC-IRC Research Officer.
- *The Environmental Side of Sustainability: Using Life-Cycle Assessment to Assess True Performance.* Mr. Wayne Trusty, President of the ATHENA Sustainable Materials Institute and its U.S. affiliate, Athena Institute International.



Sustainable Infrastructure
Techniques, Tools & Guidelines

- *Pavement Management: InfraGuide's Best Practices on Preventive Maintenance and Pavement Research at NRC.* Mr. Sylvain Boudreau, Technical Advisor to the National Guide to Sustainable Municipal Infrastructure ("InfraGuide").

2006-2007 Building Science Insight Seminars on Sustainable Infrastructure

2006 – English Seminars

- ***Fredericton, October 11****
- ***Halifax, October 13***
- ***St. John's, October 16***
- ***Winnipeg, October 24***
- ***Regina, October 26***
- ***Calgary, November 6***
- ***Edmonton, November 8***
- ***Yellowknife, November 10***
- ***Whitehorse, November 20***
- ***Vancouver, November 22***
- ***Toronto, November 28***
- ***Ottawa, December 1****

2007 – French Seminars

- ***Montreal, February 20****
- ***Ste-Foy, February 22***

* Simultaneous translation

Upcoming events

NOVEMBER

6-7
Standing Committee on Building and Plumbing Services. Montreal. Contact: Raman Chauhan at (613) 993-9633

14-15
Standing Committee on Hazardous Materials and Activities. Victoria. Contact: Philip Rizcallah at (613) 993-4064

14-15
Construct Alberta. http://www.construct calgary.com/a_program_at_a_glance.htm

16-17
Standing Committee on Use and Egress. Victoria. Contact: Philip Rizcallah at (613) 993-4064

22
Contech. Montreal. http://www.contech.qc.ca/ie_accesclient.php

29-December 1
18th Annual Construct Canada. Metro Toronto Convention Centre (South Building). Toronto. http://www.constructcanada.com/

29-30
Infrastructure 2006. Metro Toronto Convention Centre (North Building). Toronto. http://www.infrastructureshow.ca

NRC-IRC participation in these trade shows includes presentations on:

- Structural Commentaries to Part 4 of the 2005 National Building Code (Cathleen Taraschuk)
- Wind Design Guide for Flexible Membrane Roofs (Dr. Bas Baskaran)
- Flanking transmission research and design considerations (Dr. David Quirt)
- CITAC evaluation service (Alphonse Caouette)
- Infrastructure asset management—an international perspective (Dr. Guy Félio)

DECEMBER

1-3
Megacities: 2nd Mega-Cities International Conference. Guangzhou University, China PR. http://www.cibworld.nl/website/newsletter/20064.php

2007 FEBRUARY

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Seminar series – 2006
Séries de séminaires – 2006

Infrastructures durables : Techniques, outils et guides

(Remaining seminars in French only)

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Montreal – Holiday Inn Montreal-Midtown
420 Sherbrooke St. W.
Montreal, QC H3A 1B4
Tel: 514-842-6111

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Ste-Foy – Hotel Classique
2815 boulevard Laurier
Quebec, QC G1V 4H3
Tel: 1-800-463-1885

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This calendar does not include all events scheduled to take place during this time frame. For a more complete listing, see the Web version of "Upcoming events" at http://irc.nrc-cnrc.gc.ca/events_e.html

construction innovation

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